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DO ONLINE STUDENTS EXHIBIT DIFFERENT LEARNING STYLES?

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Abstract: Do online students exhibit different learning styles from onsite students; and, if so, what accommodations relating to learning style differences may be made for online students?

Instructional Issues

Most of us that have been teaching online classes are bothered by a fundamental question. That question centers around the effectiveness of online instruction. We do not wish to beg the question of how effective we might be in our "on ground" onsite or traditional classes, but we assumed that when we have face to face contact with students that we may be able to pick up feedback from our students that indicates whether or not we have been effective –and, as a result, give us time to change strategies within our classes. Indicators such as the raised hand or body language may give us messages relating to student comprehension that are missing in online delivery. Such direct feedback does not occur within the online instruction format. Over the years, we have had above average success in online class instruction, and our failure rate has not been much different from what has occurred within onsite classes using the traditional methods. Perhaps we have done more to retain students in online classes, or maybe we have just been lucky. We have held several assumptions about the makeup of online classes and wanted to explore our assumptions further. As we explored the question of effectiveness, it occurred to us that students who take online classes might do so to satisfy particular needs and might even have different learning styles from those students in our onsite classes. We decided to find out.

We used several measures to collect data. We developed our own online questionnaire to survey students at the beginning and end of online and onsite classes. This would allow us to get attitudinal information from first time online users. We could also sample students who had previously taken online courses to see if their expectations were different from those of first

time online students. We also wanted to measure any attitudinal changes occurring by the end of the course. The results confirmed many of our suspicions but also gave us some new insights into student motivation within our classes.

We also wanted to look at learning styles for online learners and contrast it with those of students in our traditional offerings. Rather than develop our own learning styles instrument, we looked at measures already in use. Of those we surveyed, (listed at the end of the article) we found the Solomon and Felder survey from North Carolina State University to be well suited to our needs. It has high validity and has been in use for some time. Results from the survey are returned quickly and could be correlated rather easily. The survey could be completed quickly, and students also enjoyed taking the survey. We have collected data for three years from a variety of groups in an attempt to gather learning profiles for these students. Data were collected from graduate and undergraduate students in both online and traditional onsite classes. Our hope was that we would see a difference in the learning profiles for our online students from that of our onsite students. We had two purposes for collecting and analyzing the information. We thought, at the very least, this information would enable us to enhance our online offerings by developing assignments that would meet this "online" student profile. And, even if there was no difference in the learning styles, by ascertaining our current students' profiles, we could adjust our teaching styles and assignments from semester to semester. This last assumption proved to be very timely.

Background Information

At MTSU, we have offered online instruction for over ten years. Like most schools,

we have learned much about the process. We are still trying to discover what "best practice" is for online classes. All of us involved in this study have approached online learning based on our traditional teaching methods and experiences. We share a variety of teaching styles, and so our online offerings, while similar in many respects, have also all been somewhat different. We have had the benefit of working with our information technology staff and have had to work with the administration choice of WebCT, or work with no front end shell program (our own websites).

Through our experiences, we have been able to share our triumphs and failures. Not only has this made us individually better, but it has also enabled us to collectively identify some weaknesses in our delivery.

Tennessee is a largely rural area. Our service area covers all of middle Tennessee – an area of several hundred square miles and more than 30 counties. When we started our online offerings, we discovered our area had grown both in size and complexity. Not only were we dealing with a wide area, but we were also dealing with almost a dozen different service providers, and we had students from other states and countries. Some of our students had access to T1 lines and others had dial-up connections. We mention this not just because we are serving a different clientele from other states -- we are not -- but because we spent much of our energy on delivery problems rather than refining our curricular offerings. Although all of us work with practicing teachers (or preservice teachers), our programs range from undergraduate teacher licensure preparation programs through Masters and Ed.S. Degree programs in curriculum and instruction involving add-on licensure in areas as diverse as English as a Second Language and Professional Administration. Finally, after solving most of our start-up problems, we were ready to look at the quality of our courses.

Our Online Survey

We developed several surveys to attempt to understand our students' perceptions about online classes. We had done this individually for some time to get feedback on our own courses, but

thought it was time to get departmental input on all our courses. The survey used (See Online Class Survey Instrument [Appendix A]) is

our own and probably similar to those used by other universities. We originally suspected that techno-savvy students would be those most likely to take online classes and many students might prefer onsite traditional course offerings. We had other ideas that were both confirmed and rebuked by our results. We also wanted to measure students' attitudinal changes from start to end of the classes.

We learned students take online classes for the convenience of pursuing a degree on their own timetable. They want to be with their families; they don't like the commute, and they don't want to fight for a parking place. Another thing we learned is that people who take online classes have a tendency to work on assignments at times which we would never offer to on-campus classes. Parents get online after their children are in bed. Professionals and educators stay at work to take advantage of business internet connections. Undergraduates tend to be online after midnight. In other words, online classes meet at any time a user is ready. Perhaps one of the biggest reasons students took online classes was not to have to come on to the MTSU campus at all! Finally, many students who did not like online classes said it did not meet their learning styles or they preferred a traditional classroom setting.

Once we understood that it was not the techno-savvy folks making up the largest portion of our online students, we were faced with the challenge of finding out how to improve instruction further. Did students with certain learning characteristics or abilities do better than others? Perhaps there was a profile of the successful online student – or at least we could find some multiple personalities that might tell us more about who we were dealing with and how best to meet their needs. Would the research by Howard Gardner and Associates help define students who had gifts in spatial, logical, or linear thinking as having some advantages in online classes? Unfortunately, no easy way to identify those folks seemed to readily apparent to us.

Learning Styles

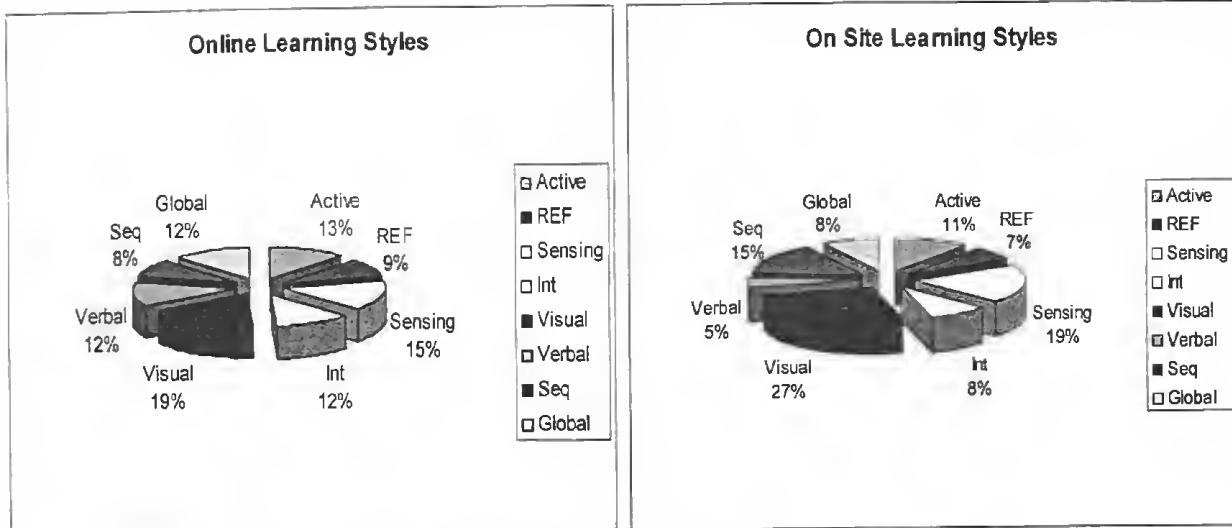
As a result, we considered examining educational research which focused on learning styles. It is important that instructors provide assignments to complement learning styles. Matching instructional style to learning style has been shown to enhance learning, that is, "...retain information longer, apply it more effectively, and have more positive attitudes toward the subject of the course." (Moallem, 2003) Were some student's learning styles predisposed to success in

an online class? We discovered an online survey tool to assist us in defining and examining these learning pre-dispositions. Barbara Solomon and Richard Felder at North Carolina State University have developed a simple online survey (See Felder-Solomon Learning Styles Questionnaire [Appendix B]) to give students feedback on their learning styles. The survey is short (44 questions), has been used since 1997, and returns results to students in a short time. The four matched learning style areas contained in the survey are:

Solomon – Felder Learning Styles Summary	
Active – like to use new material such as discussion, explaining, group work. Taking notes is difficult. Active learners must be involved in learning by doing	Reflective – need time to think about new information, not good at memorization or just reading material one time
Sequential – like information presented in linear steps. Need some help putting the "big" picture together	Global – big picture learners can learn different things and then put them together
Sensing – like learning facts, follow proven methods of exploration and problem solving, good at memorization, careful, practical learners, like real world connections	Intuitive – like discovering possibilities and relationships, tend to take risks in learning, don't like to bog down in repetitive tasks, may be prone to careless mistakes
Visual – learn best by what they see, like charts graphs, pictures, films, demonstrations	Verbal – learn more from written or spoken presentations, like hearing discussion and explanation

The survey asks student to choose their preferences and gives them feedback concerning their own learning style. (See attached printout). Obviously, each student has some of all the learning styles but not necessarily a balance of each. Students who have a predilection for one style over another may have difficulty learning in some areas. By assessing not only our students' learning styles but also looking at our assignments in our classes, we were able to "map" student

preferences and our offerings. Some studies have found that student with indicators of extroversion (Active), intuition (Intuitive), thinking and judging (Active and Sequential) tend to be more satisfied with online learning. (Altman, 1988). Learner satisfaction has a high correlation with distance education success. (Kelly, 1994) We were able to bear out these results when we compared the responses to our survey and the Learning Styles Index results.



Examples from Fall, 2006 N=16 for Online and N=64 for On Site

While we found students who preferred visual learning were slightly less inclined to prefer online classes, we found no one discernable learning style to be prevalent in most of our online classes. Preferences were more likely dictated by other considerations than learning styles. For example, setting one's own pace of learning outweighed the visual learning style preference one might expect as a consideration in choosing online classes. What we did find was that

satisfaction in online course seemed to increase when we were careful to design assignments to cover all learning styles. This confirms earlier findings in classes where teachers design a variety of assignments and the students use all learning styles. (Feldman, 1996)

We found the following modifications and design considerations to be useful in meeting all learning styles.

Active/Reflective	Post notes or guides to information Use guided readings Add field experiences to online classes Use online discussions through software or list serves Add group work to get students to exchange information
Visual/Verbal	Organizers as product (webbing, charts, flow charts) Teleresearch Audio presentations (PowerPoint/Impactica) Assignment details are elaborated in written document
Sensing/Intuitive	Case studies. Analogies / Examples before theory.
Sequential/Global	Connect new material to old. Overview of assignment and objectives defined. Road map for a complex assignment

We would strongly recommend the use of this survey at the beginning of courses so modifications may be made. The website for the survey can be found at
<http://www.engr.ncsu.edu/learningstyles/ilsweb.htm>

ml. Of course, if good course design is used at the onset, all learning styles should be met but it is possible to have a class with a imbalance or learning preference quite different from design expectations. We have certainly found each class

may have quite a difference in balance of learning styles. Some of this may be due to the use of screening tools for certain classes or perhaps it is the luck of the draw. “Learning styles are a way to help improve your quality of learning. By understanding your own personal styles, you can adapt the learning process and techniques you use.” (Learning-styles-online.com, homepage) We have found helpful information at Learning-styles-online.com website <http://www.learning-styles-online.com/> this site is dedicated to helping you better understand learning styles, as well as providing an easy way to discover your own styles.”

A consideration that is not found in any survey is a measure focusing on whether or not students have a propensity to procrastinate. No student will initially admit to procrastination – especially if it might affect entry into a class. There is no disputing that some students not faced with mandatory attendance will not be on time. Deadlines help, but this does not force students to participate in discussion or other areas where they must be active, on-time participants. Assessment should include incentives to not only get students to participate in a timely fashion but also in a meaningful way. Calendars and timelines help, but students can still “sit” in the back of the room if you let them. Course design and instructor persistence also help but cannot make all students successful if they choose to procrastinate. Even time logs with WebCT and other programs do not provide any indication of quality time spent on task. These logs are measures of access time and login events only. The logs though are useful tools for knowing which students might need some “prodding” to keep up with assignments.

Conclusions

Our “Best Practice” ideas have been continually evolving to keep up with our students. We have tried a variety of things to make sure students understand what kinds of challenges they face in an online class. Though we are now teaching the “computer generation,” most students have been trained to succeed in an “on-ground” atmosphere for at least 12 years before they enter college. Many must relearn how to succeed in

another setting. It is important to remember to remove as many obstacles to their success as possible to that online delivery is centered on learning content usable by various learning styles. Our advice is to keep the process dynamic and to seek feedback from students to be sure learning is as student centered as possible.

References

Felder, Richard M. Index of Learning Styles (ILS). North Carolina State University Retrieved, from <http://www.ncsu.edu/felder-public/ILSpage.html>

Felder, Richard M. (1996) Matters of style. ASEE Prism, 6(4).

Feldman, K. (1996). Identifying exemplary teaching: Using data from course and teacher evaluations. In M. Svinicki and R. Menges, (Eds.). Honoring Exemplary Teaching, New Directions for Teaching and Learning, 65, 41-50. San Francisco: Jossey-Bass.

Kolb, D. A. (1984). Experiential learning: experience as the source of learning and development. Englewood Cliffs, NJ: Prentice Hall.

Moallem, Mahnaz. (2003). Applying learning styles in an online course, Academic Exchange Quarterly, 7[4], p209(6). Retrieved from Tennessee Electronic Library. InfoTrac One File.

Reviewed and Recommended Online Sources:

Abiator’s online learning styles
<http://www.berghuis.co.nz/abiator/lsi/lsites/t1.html>

Lpride Learning styles
http://www.ldpride.net/learning_style.html

Learning Styles Online.com <http://www.learning-styles-online.com/>

<http://www.conti-creations.com/atlas.htm> ATLAS learning styles of adults.

<http://www.fastrak-consulting.co.uk/tactix/features/lnstyle/style04.htm> Fastrack learning. Styles

Appendix A: - Online Class Survey Instrument

Instructions for completing this survey:

There are 4 parts to this survey:

- The first part consists of your perceptions about online classes before you enrolled and should be answered based on ideas you had prior to enrolling.
- The second part deals with your perceptions now that you have completed or are currently enrolled in an online class.
- The third part is filling out the online survey to determine your learning style.
- Finally, in the fourth section you are asked to indicate how well the online course has met your learning needs. This information not only gives us feedback about your

motivation for taking an online class but will be invaluable in helping us design online classes that fit a variety of learning styles.

What you need to do:

1. Answer the questions in Parts 1, 2, & 4 on this form, save it as “perceptions-yourlastname.doc” & attach the file to an email to your instructor.
2. After you complete the online “learning styles” survey (Part 3) save it as “surveyresults.htm” and attach to an email to your instructor.

If you have problems emailing the files as attachments, please contact your instructor.

Part One

Online Course Perceptions Prior to Enrolling

Place an X next to all that are reasons that you considered before taking this course (what you considered before the course started)

	A	I don't want to drive to campus
	B	I don't like to sit in a classroom
	C	It was not possible for me to be available on the day/time that the on ground class was offered
	D	I have a learning style that matches online learning style
	E	I like to do my coursework at any time during the day or week
	F	I have taken online classes before and knew what to expect
	G	Online courses usually have less work
	H	I find the online assignments compatible with my needs and abilities
	I	I am computer/technology proficient and am at ease with technology
	J	This course is only offered in an online format
	L	I like being the person responsible for my own learning
	M	I was curious about how to take on online class
	N	I like being able to set the pace of learning
	O	I like being able to see all of the course content at any time
	P	Obligations to family
	Q	Distance from MTSU
1. If there are any other reasons not listed for taking an online course, please tell me below.		

2

Would you take another online course? (Check yes or no)

Yes

No

Part Two

Online Course Perceptions While in Course

Now that you have enrolled or have completed an online class, place an X by ALL of the reasons that you think are GOOD REASONS for taking an online class.

A	I don't want to drive to campus
B	I don't like to sit in a classroom
C	It was not possible for me to be available on the day/time that the on ground class was offered
D	I have a learning style that matches online learning style
E	I like to do my coursework at any time during the day or week
F	I have taken online classes before and knew what to expect
G	Online courses usually have less work
H	I find the online assignments compatible with my needs and abilities
I	I am computer/technology proficient and am at ease with technology
J	This course is only offered in an online format
K	I would not take this course if it were not required
L	I like being the person responsible for my own learning
M	I was curious about how to take an online class
N	I like being able to set the pace of learning
O	I like being able to see all of the course content at any time
P	Obligations to family
Q	Distance from MTSU

2. Are there reasons that would prevent or deter you from taking another online class? Please explain below.

Part Three

Take the Learning Styles Assessment at <http://www.engr.ncsu.edu/learningstyles/ilsweb.html> (or use previous results) please do so to help us answer questions we have concerning our online courses. Once you have completed the survey, save it as "surveyresults.htm" and attach it to an email to your instructor.

Part Four

After you have taken the online survey, look at your results to answer the survey questions in Part 4. Please read the following information and answer the questions following this section about this online course.

Brief Description of Learning Styles

Active and Reflective Learners:

Active learners tend to retain and understand information best by doing something active with it – discussing or applying it or explaining it to others. Reflective learners tend to think about it quietly before responding. They tend to like to work alone. Active learners might be described by "Let's try it and see how it works" while reflective learners might prefer "Let's think it through first".

Sensing and Intuitive Learners:

Sensing learners like learning facts and solving problems by established patterns,

while intuitive learners prefer discovering possibilities and don't depend on explained material. Sensors tend to be good at memorization and hands-on learning, while intuitive learners tend to grasp new concepts and abstractions.

Sensors are more careful and practical than intuitors while intuitors tend to be more innovative and work faster. Sensors like courses with connection to the real world while intuitors don't want to get bogged down in routines "plug-in" courses.

Visual and Verbal Learners:

Visual learners learn best when they can "see" pictures, diagrams, time lines, and etc. while verbal learners create pictures out of words – spoken or read.

Sequential and Global Learners:

Sequential learners understand best when things are laid out in a linear fashion – each step logically follows the previous one. Global learners tend to make connections in large jumps, absorbing material randomly without any seeming connection. Sequential learners follow logical paths in coming up with solutions to complex problems but global learners can solve problems quickly once they have grasped the "big" picture. Sequential learners can explain problem solution step by step whereas global learners may have difficulty explaining how they arrived at the solution.

For more explanation of your Learning Styles Survey, <http://www.ncsu.edu/felder-public/ILSdir/styles.htm> Now take a look at your

Learning Styles Survey results from the online survey and consider the following questions:

3. How does this online course fit with your learning styles?
4. Specifically, how has the arrangement of this course met your learning style? Conversely, if the course has not met your learning style, identify how your needs were unmet. (If you have some needs met and some not met, so much the better.)
5. Finally, if the course could be changed to meet your learning needs, what changes would you suggest?

Use space below to answer questions 3-5:

3. *The course fits well because I can see what's expected of me through the examples that are given for each assignment.*
4. *As I said, everything that is expected of me is laid out in a clear manner. I can easily obtain help from the instructor for any problem that I am experiencing.*
5. *I do not suggest any changes. This course works really well for me.*
6. Answer the questions in Parts 1, 2, & 4 on this form, save it as "perceptions-yourlastname.doc" & attach the file to an email to your instructor.
7. After you complete the online "learning styles" survey (Part 3) save it as "surveyresults.htm" and attach to an email to your instructor. Thanks for your help!